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NOTES ON CLIMATOLOGY.

BY

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THE DUSTFALL OF MARCH 9–12, 1901.—There are several instances on record of the occurrence of falls of dust in different parts of Europe, the origin of the dust having been in the desert region of northern Africa, and the fall having taken place either with or without precipitation. The remarkable dustfall of March 9–12, last year, fortunately took place over some of the most thickly-settled portions of Europe, where there are numerous meteorological stations, and where, in consequence, all the phenomena associated with the occurrence were carefully observed. A monograph on this duststorm has recently been published by Hellmann and Meinardus, of the Prussian Meteorological Institute in Berlin, and this is the most elaborate report upon any such storm that has ever been issued (*Der Grosse Staubfall vom 9 bis 12 März, 1901, in Nordafrika, Süd- und Mitteleuropa*, Abhandl. K. Preuss. Met. Inst., II, 1).

The district over which the dust fell extended from the desert of southern Algeria northward into southern Denmark, *i. e.*, over a distance of more than 25° of latitude, and the total area of the region was at least 800,000 sq. km. An additional 450,000 sq. km. were taken up by water surfaces. Duststorms occurred in southern Algeria on March 8–10; and as the dust was carried northward it fell in Sicily and in Italy on March 10; in the eastern Alps on the night of the 10–11th; in northern central Germany on the forenoon of the 11th; in northwestern Germany on the afternoon and evening of the 11th; and in southern Denmark on the night of the 11–12th. Further eastward the fall came later. Thus it occurred in Hungary on the morning of the 11th; in Galicia, Posen, and western Prussia on the afternoon, and in eastern Prussia late in the evening of the 11th; and in the Russian provinces of Kostroma and Perm on the afternoon and evening of the 12th. In Algeria and in Tunis the fall was of dust. In Italy dust fell during a dry *sirocco* wind, and rain heavily charged with dust also fell. In Austria-Hungary and further north the phenomenon was everywhere associated with some form of precipitation (rain, snow, frozen rain, etc.). The amount of dust decreased from south to north, which is one proof of the southern origin of the dust. Twothirds of the total fall occurred south of the Alps. The color of the dust was reddish-yellowish-brown, and microscopical examinations of the deposit collected in various places made it plain that the dust was of terrestrial origin—an æolian deposit resulting from the disintegration of rocks in a desert region. As the distance from their source increased, the dust particles became finer and finer, and a decrease in the percentage of quartz was noted. As the dustfall progressed northward a barometric depression advanced from Tunis in a north-northeast direction to the southern shore of the Baltic Sea. The exact place of origin of this depression cannot be determined, but the winds and weather on March 9 seem to show that a depression was at that time located in the desert region of southern Algeria; and this depression was probably strengthened on its northward progression by combining with a second weak area of low barometer which came from northwestern Europe. The pressures at 2,500 metres above sea-level show that as the dustfall moved northward there was a southerly upper current at that altitude from Tunis to central Germany. The velocity of this upper current was found to be 70 km. an hour, and the northward progression of the dustfall was also found to be at the same rate.

Altogether, the report made on this interesting phenomenon by Drs. Hellmann and Meinardus is most complete and most suggestive. There is much in the volume which will interest the geologist and the geographer, as well as the meteorologist. It is fortunate that this remarkable dustfall came where it could be so well studied, and that two such competent meteorologists set themselves the task of discussing the data.

THE HEALTH OF THE ARMY IN 1901.—Climatologists, as well as medical men, may find much of interest—and it may also be much of discouragement—in the annual *Report of the Surgeon-General of the Army* for the year ending June 30, 1901. There is abundant evidence in this report that the United States is involved in tropical warfare, with all that that means in the way of disease and death among those whom duty calls to service in climates other than their own. There are, of course, also many most encouraging signs of success in the treatment of various diseases. Thus the United States General Hospital for the treatment of pulmonary tuberculosis at Fort Bayard, New Mexico, has proved extremely useful. The selection of this site for such a hospital has been amply justified by the results. The location is in the dry mountainous region of New Mexico, at an altitude of 6,040 feet above sea-level, and the climate permits comfortable outdoor life during the entire year. The mean maximum temperature for the past ten years was 69.6°, and the mean minimum 39.8°. In 78 per cent. of the cases treated during the year the disease was contracted in the Tropics. In the report of the United States General Hospital, Presidio of San Francisco, there is some information regarding the cases of insanity among soldiers who have seen service in the Philippines, which is of interest because of the considerable prominence that has lately been given this subject in the daily press. The surgeon in charge of the Presidio Hospital says that the etiology of insanity in soldiers who have returned from the Philippines is at once a simple and a complex subject. A large proportion of the cases which become insane he believes to have had a hereditary taint, which was not discovered prior to enlistment.

> This, taken with the long distance from home, the intense heat of the tropical sun, constant harassment by an enemy which it is impossible to see, excessive use of alcoholics, and the depressing influences always present in a tropical climate, will account for the changed mental condition.

The death-rate from disease in the Philippine Islands was 20.26 per thousand, the principal cause of the fatalities being dysentery. In connection with this seemingly low death-rate it is well to point out that a large number of soldiers are invalided home who would undoubtedly die were they to remain in the tropical climate, and, further, that the death-rate of most of our cities, which does not differ very much from the figures above given (20.26 per thousand), includes persons of all ages and of both sexes, and includes deaths of all kinds. In the case of the death-rate of the army in the Philippines men only are concerned, and these are supposed to be picked men, of sound health, most of them still to be called young, in the prime of life. In the City of Boston the death-rate for five recent years was 21.28 per thousand, but the average death-rate for males between 20 and 50 years of age was but 3.42 per thousand. It is with this death-rate of 3.42 per thousand (in the case of Boston) that the death-rate in the Philippines should be compared. The death-rate among the British troops in India in 1896 (the last year for which the compiler of these NOTES has the data) was 14.84 per 1,000 of strength. In China the date-rate of our soldiers from disease was 23.62 per 1,000.

Col. Charles R. Greenleaf, Chief Surgeon, Division of the Philippines, reports that

> The most energetic and stalwart American after a year of service here loses energy, strength, and ambition. He performs what work his duty demands more or less half-heartedly, and with a draft on his vital energy that he can actually feel at the time.

Regarding the campaign in China, Surgeon G. A. Lung reports that the excessive heat experienced sometimes resulted in the prostration of 150 men, many of these having convulsions. Some of those who had convulsions, and were rendered unconscious, could walk into camp in the cool of the evening. An interesting note regarding the climate of Peking is worth mentioning here. That section is frequently visited during the winter by severe winds of several days' duration. Duststorms of indescribable severity are thus developed, and these cause great bodily discomfort and annoyance, as well as constituting one of the most unhealthy conditions of Peking. In every case, after a severe storm of this character occurred, the sick report was materially extended, the additional causes of admissions being affections of the respiratory organs, including pneumonia and bronchitis. A sanitary commission, consisting of the foreign medical officers in Peking, inaugurated a system of street sprinkling, to the great benefit of all the foreign residents.

During the year 1897, when all the troops of the United States served at home stations, the hospital admission rate for diarrhœal diseases was 73.77 per 1,000 of strength, with no deaths. Dysentery was a comparatively rare disease, and seldom fatal. In 1898, as a result of war service in Cuba, Porto Rico, and the Philippines, the admission rate rose to 388.62, and the increased gravity of the cases was shown by a death-rate of 1.45 per 1,000 of strength. In 1899 the admission rate was 380.69, and the death rate 2.14. During 1900–1901 the admission rate increased to 465.01 and the death-rate to 6.47, because of the relatively large proportion of the army which was exposed to the causes of diarrhœal and dysenteric diseases in the Philippines. Among troops serving in the United States the admission rate last year was only 96.57.

The problem of the acclimatization of the white race in the Tropics, as already stated several times in these NOTES, has hitherto been discussed solely by European writers, chiefly French and German, because European nations have had experience in the settlement of tropical possessions, whereas we of the United States have, until 1898, had nothing to take us to the Tropics as a people. Now, however, with our occupation, temporary or permanent, of tropical islands, we North Americans are gathering material from our own experience which will make it possible for us to discuss this question on our own account. The report of the Surgeon-General of the Army, now under consideration, contains some American contributions to the acclimatization question. In addition to the facts above referred to, regarding tropical diseases and the death-rate from disease, we find some more direct statements in the *Observations upon Diseases in the Tropics*, by Major Charles P. Mason, Surgeon 26th U. S. Infantry, at Jaro, Province of Iloilo, Philippine Islands. Very striking is Major Mason's statement:

> In the first place, as to acclimatization, if that term is intended to convey the idea that the constitutions of white men gradually adjust themselves to tropical conditions, and thereby become better able to withstand disease, then I do not believe that there is any such thing as acclimatization. Men do gradually learn how to take better care of themselves, and to that extent are less liable to disease; but, in my opinion, the great majority of white men in the Tropics suffer a gradual deterioration of health, and year by year become less and less fit for active service.

While this may seem to some a rather exaggerated statement, it is, nevertheless, important as coming from a competent observer, who has had excellent opportunities to study the effect of a life in the Tropics upon the American soldier. Major Mason's other observations upon tropical diseases are likewise noteworthy. Dysentery he finds prevailing throughout the year, with a marked increase in the number and severity of the cases at the commencement of the rainy season, and a progressive increase in both respects until a maximum is reached toward the end of August. This is the most serious disease, both as regards its mortality and its invaliding effects. While dysentery is most prevalent during the rains, smallpox is found most common during the dry season, disappearing almost completely in the rainy season. This may possibly be explained by the greater freedom of communication during the dry season, when travelling is easier, or, more probably, by the agency of dust as a carrier of infection.